no broken stems, *not smoothed* at the broken end should be found. Split stems, and fragments of bowls are met with, and occasionally an entire pipe. The specimen figured (150) giving a good idea of the whole series as found by me, was taken from an "Indian" grave, associated with the usual "find" of relics so occurring. This fact seems to indicate that whether utilized pipe-stems or implements *de novo*, they had some special use; and I suggest that such use was as whistles. By placing the thumb over the basal or larger opening, and holding the specimen at right angles to the lips, it requires but a slight blowing effort to make a remarkably shrill clear whistling, which can easily be heard a quarter of a mile. In the hands of the aborigines, accustomed to their use, no doubt a much shriller "call" could be made with them. Of course the whole matter is an undeterminable one, but I suggest this as a plausible explanation of the presence of considerable numbers of this peculiar relic.—CHARLES C. ABBOTT, M. D., *October*, 1874.

THE BRONZE AGE IN SWITZERLAND.—The Memoirs of the Society of Natural Sciences of Neuchâtel (Tome. iv, part 2), contains a beautifully illustrated memoir on the bronze age in Switzerland, especially of the Lacustrian inhabitants.

MICROSCOPY.

A SECTION CUTTER FOR HARD OBJECTS.—Dr. George Hoggan's section machine, as described at the Queckett Club, differs radically from the tubular style of section cutters in common use. According to the inventor's assurance, which is fully justified by the appearance of his contrivance, he had at the time of its construction never seen a section cutter of any kind, and to this fact he attributes the originality of his conception. The object to be cut, instead of being packed in a tube, is (protected by slices of carrot or pieces of paper) fastened by means of a clamp and binding screw upon a sliding support or "table" which is moved in a grooved track at right angles to the course of the saw or knife by a screw capable of giving a graduated motion of $\frac{1}{500}$ inch. On each side of this sliding table, and attached to the bed-plate on which it slides, is an upright guide-bar to serve as a lateral support for the instrument making the sections. Hard sections, as of bone, are cut with a fine saw, what is called the "Pearl saw" being the best, which, like all other saws, should in Dr. Hoggan's

opinion, be mounted so as to cut during the pulling and not during the pushing stroke. The saw cuts sections of bone at the rate of one in two to three minutes, which are sufficiently thin and smooth, and only require to be washed free from sawdust to be ready for mounting. The saw frame being thicker than the blade, the upper part of each of the guides is set back so that the blade and frame of the saw will both move in the same perpendicular plane. Both blade and frame are held against the guides by steel springs, the face of the guides being also protected by hardened steel, securing a correct path for the saw independently of the skill of the operator. For cutting soft tissues, with a razor, the instrument is turned so that the cutting is done in a horizontal instead of a vertical plane, the object being arranged on the sliding table by means of a tray. The cavity most convenient for ordinary work will contain a $1\frac{1}{2}$ inch cube of the material to be cut, though it may be so enlarged as to permit the cutting of a section of 4×6 inches.

Recent Objectives.—Mr. Charles Brooke in his President's Annual Address before the Royal Microscopical Society, makes some interesting suggestions in regard to last year's improvements in object glasses. A "remarkably fine $\frac{1}{8}$th" by Powell & Lealand, with an avowed single-front lens is mentioned, but its principle of construction is not discussed, as it has not been made known by its makers.

Increased flatness of field has been obtained in objectives constructed on Mr. Wenham's formula, by replacing the original single plano-convex posterior lens by two plano-convex lenses of proportionally less curvature. Mr. Brooke possesses a $\frac{1}{7}$th thus improved, which excels in definition any other objective in his possession. It defines well with the sixth eye-piece of Ross, which however, he would never think of using except as a test of definition.

The fog which is so conspicuous a defect in some otherwise excellent glasses, he suggests may be partly due to the multiplication of cemented contact-surfaces, and that it may be so excessive in certain cases because of increasing not in the simple ratio of such surfaces, but in proportion to the square of that number, as if an objective with four cemented surfaces should have four times as much fog as one with two such surfaces.

PERSONAL EQUATION IN MICROSCOPY.—The "Monthly Microscopical Journal" gives the following excellent summary of Mr. Ingpen's interesting communication on the above subject to the Queckett club:—

"Mr. Ingpen communicated some notes on 'Personal Equation,' with reference to microscopy. He first explained the use of the term in astronomy, as exemplified in transit observations, and in its more extended differences by a constant quantity between observers, short of actual defects of vision. The same causes affected microscopical observation, though they were not so well recognized as in astronomy. The principle points referred to were the following: I. *Mental* equation, as causing differences in interpretation, particularly with regard to test-objects. II. *Nervous* equation, as shown by varied sensibility to tremors, etc. III. *Color*. Difficulty in estimating color, as noted in Admiral Smyth's 'Sidereal Chromatics.'—Right and left eye often differ in this respect.—Effect of yellow crystalline, referred to by Professor Liebreich in his lecture on 'Turner and Mulready.'—Difference in visibility in violet end of the spectrum, amounting in some cases to slight fluorescence.—Effect of red and yellow grounds in increasing definition in certain cases.—Effect of bluish mist caused by slight opacity of cornea or crystalline upon estimation of the correction of objectives.—Color blindness often existing in a slight degree unsuspected, and difficult of detection. IV. *Focal equation*. Differences in effect of long and short sight upon cover correction, etc., also upon depth of focus, and power of resolving surface markings.—Differences in size of images formed by right and left eye, and consequent effect upon binocular vision.—Want of accommodation, and pseudoscopic vision, etc. V. *Form*. General tendency of the eye to show ultimate particles circular.—Effect of square and triangular apertures.—Effect of astigmatism upon form, particularly of lines and dots, as seen in different directions.—Reference to Professor Liebreich's lecture.—Effects of diffraction upon points of light, etc.—General considerations of the effects of unnoticed differences of vision producing discrepancies often attributed to other causes."

The microscopists seem no more agreed than other critics, as to the peculiarities of the later Turner pictures, as "Mr. J. G. Waller differed from Mr. Ingpen with reference to the later pictures of Mulready, which Professor Liebreich considered to show the effect of yellow crystalline; and gave reasons for thinking that the blueness of those pictures was due to their unfinished condition. He thought also that Turner's later pictures showed extravagant mannerism which could be thrown aside at will."

PIGMENT-PARTICLES.—Dr. J. G. Richardson's suggestion that particles of dried blood which washing has failed to remove from

the irregular surface of previously used glass slips or covers have been habitually mistaken for recent objects and have become familiarly recognized as pigment-particles, is discredited by Mr. Brooke, who does not believe such a theory applicable to the work of experienced microscopists.

NOTES.

MR. R. U. PIPER in an article in a daily paper on the use of Paris green in killing potato beetles, warns people against its use as it is a deadly poison. A single grain is sufficient to cause death, and a little of the dust received into the system from time to time is extremely dangerous. M. de Kerchove also deprecates the use of the arsenite of copper (Scheele's or Paris green) as too dangerous a substance to be made common. Its careful use during the coming season should be inculcated.

SIR CHARLES LYELL has bequeathed $10,000 to the Geological Society of London, "for the encouragement of geology, or of any of the allied sciences by which they shall consider geology to have been most materially advanced, either for travelling expenses, or for a memoir or paper published or in progress, and without reference to the sex or nationality of the author, or the language in which it may be written."

DR. HOFMANN, of Berlin, recently delivered the Faraday Lecture of the Chemical Society at London. At a dinner, when one hundred and eighty scientists were present, "probably," says "Nature," one of the most remarkable scientific dinners that have taken place for some years, he made a noble appeal in behalf of the recognition of the high value of pure scientific research.

DR. STEINDACHNER recently read a paper before the Imperial Academy of Sciences at Vienna, on the river fishes of the south-eastern coast district of Brazil, from the mouth of the La Plata to that of the San Francisco.

DANIEL HANBURY, the joint author (with Dr. Flückiger) of a late work entitled "History of Drugs" died March 24th, aged 49. He was an F. R. S. and treasurer of the London Linnæan Society.

DR. H. R. GOEPPERT, the venerable professor of botany at Breslau, celebrated the fiftieth anniversary of his graduation, Jan. 11th.